



# **2006 Pest Survey, Nursery and Field Inspection Report**

**Prepared by**

**Colorado Department of Agriculture  
Division of Plant Industry**

**April, 2007**

# 2006 Pest Survey, Nursery and Field Inspection Report

by

## The Colorado Department of Agriculture

### Phytosanitary Export Certificates and Inspections.

Phytosanitary export certificates are issued by the Colorado Department of Agriculture (CDA) to meet the needs of Colorado growers and exporters of plant commodities when shipping to foreign countries and in some cases to other states. Certificates declare freedom from injurious insects and plant diseases.



For Calendar Year (CY) 2006 a total of 1,558 acres in 81 fields were inspected. This acreage is almost unchanged from last year. There were 1,980 federal phytosanitary certificates and 143 state phytosanitary certificates issued, for a total of 2,123 during the past year.

**Greenhouse and European Corn Borer Quarantine Inspections.** Greenhouse grown cut flowers and potted plants that will be exported to other states and countries are inspected and certified by Division personnel for freedom from insect pests and plant diseases. This is a requirement of the receiving states and countries. In addition, some inspections are made on field grown flowers. Most greenhouses are inspected twice annually and field grown flowers once each year.



The greenhouse growing area inspected in 2005-2006 was 10,729,824 square feet. The number of greenhouses inspected were 46. Greenhouses are inspected four times each year for compliance with the Japanese beetle harmonization plan to allow these greenhouses to ship plant material to western states.

Wholesale florists, who were the actual exporters of the flowers and plants, numbered 44. Field grown flowers were inspected during active growth in late spring or summer. Both flowers and underground propagative parts of these plants are sold and required by receiving states to be certified at origin. Gladiolas and irises are the main crops.

*European Corn Borer Quarantine.* The European corn borer quarantine requirements are in effect for nine western states, which apply to shipments of corn, sorghum, sudangrass and broomcorn from Colorado into those states. These commodities must be screened or fumigated to eliminate European corn borer larvae that may be shipped with the host commodity. The most common commodity is shelled corn, but some fresh sweet corn is shipped. Shelled corn is screened to physically



[www.ent.iastate.edu/pest/cornborer](http://www.ent.iastate.edu/pest/cornborer)

exclude the host material, but the fresh ears must be fumigated. At the end of the fiscal year twenty-one companies were under agreement with CDA to meet the other states' quarantine requirements. Inspections are made on equipment and procedures to see that these companies are meeting the requirements.

## Quarantines

*Late Blight Quarantine.* The Late Blight Quarantine was amended in May of 1999 to provide alternative methods of cull potato disposal, primarily composting. In addition, requirements for cull disposal were strengthened for the time period between June 1 and September 10 to provide maximum protection against Late Blight during the growing season.

All seed potatoes imported into the San Luis Valley are inspected under the authority of the Late Blight Quarantine by a CDA inspector in the San Luis Valley. A total of 166 loads were inspected. There were no suspect tubers to be tested at the San Luis Valley Research Center. Four compost facility inspections were performed and 44 cull pile inspections were conducted.



[www.ndsu.nodak.edu](http://www.ndsu.nodak.edu)

There has not been any Late Blight detected in the San Luis Valley since 1999. The quarantine will continue for 2007.

*Peach Mosaic Quarantine.* Colorado's has a quarantine for symptomless carriers of peach mosaic disease. This quarantine only affects Mesa County. Routine inspections were conducted and no violations were found.



[www.coopext.colostate.edu](http://www.coopext.colostate.edu)

*Prunus Quarantine.* A quarantine was adopted in February 2004 against certain *Prunus* species in the San Luis Valley. The purpose of this quarantine is to protect the potato fields in Alamosa, Conejos, Costilla, Rio Grande and Saguache counties against the overwintering host of the primary aphid vector of certain viral diseases that affect potatoes. The quarantine prohibits the importation of certain *Prunus* species into Alamosa, Conejos, Costilla, Rio Grande and Saguache Counties, Colorado.

## Nursery Program.



*Nursery Dealer and Landscape Contractor Inspections.* Nursery dealer inspections are performed, mainly in the spring, at locations where stock is held for sale but is not being propagated or grown. Statutorily nursery dealers are considered nurserymen but for inspection purposes they are separated. Dealers' stock is inspected for plant pests, viability of plants, adequate root systems, proper containers, correct labeling and proper handling and care. Cease and desist orders and stop-sale orders are issued when violations are found. Both consumers and sellers benefit from the program, which improves the image of the nursery industry in Colorado by being a regulated industry. Landscape contractors' stock is inspected only when they have a holding area, which most landscapers do not.

Nursery registrations were issued to 879 nursery dealers, including 42 collectors, in 2006, a slight decrease over the previous year. Registrations issued to landscape contractors declined to 496. The percentage of stock inspected that was placed under stop-sale increased slightly to 1.67%.

*Nursery and Turfgrass Inspections.* Inspections of nursery growing fields are made for insect and disease pests once a year. Turfgrass sod fields are inspected for insect and disease pests, as well as, certain weeds once each year. Inspection certificates are issued and they facilitate shipment of nursery stock into other states.

Nursery registrations issued to growing nurseries totaled 236. Registered sod growers totaled 48. Nursery acreage decreased from previous year to 4,997 acres. Turfgrass acreage increased significantly to 8,340 acres.





---

---

**Cooperative Agricultural Pest Survey  
(CAPS)**

**Annual Reports  
FY2006**



---

---

**TABLE OF CONTENTS**

1. CAPS CORE Project.....	2
2. General Weed Survey and Biocontrol Program.....	5
3. Cereal Leaf Beetle Biocontrol Program.....	9
4. Cereal Leaf Beetle Survey .....	9
5. Emerald Ash Borer Trap Tree Detection Survey.....	10
6. Exotic Fruit Pest Survey .....	10
7. Gypsy Moth Detection Survey.....	11
8. Kaphra Beetle.....	12
9. Karnal Bunt.....	13
10. Old World Bollworm .....	13
11. Survey of Colorado Production areas for Exotic/Emerging Plant Pests.....	14
12. Spodoptera littoralis .....	15
13a. Phytophthora ramorum – National Trace Forward Survey.....	16
13b. Phytophthora ramorum National Nursery Survey .....	16
14. Exotic Wood Boring Insect Survey .....	17
15. Japanese Beetle .....	19

# Cooperative Agricultural Pest Survey (CAPS)



Annual Reports  
FY2006



Compiled by:  
**Kara Hempy-Mayer, SSC**  
**Colorado Department of Agriculture (CDA)**  
**Plant Industry Division**

The following projects have been carried out with CAPS support, either wholly or in part. Three CAPS projects were coordinated by Colorado Department of Agriculture (CDA), two jointly by CDA and Colorado State University (CSU), seven by CSU, and one by the Colorado State Forest Service (CSFS). APHIS-PPQ conducted two additional trapping surveys, and contributed the resulting data to the NAPIS database. Official diagnostics for the majority of projects were carried out at the Department of BioAgricultural Sciences and Pest Management at Colorado State University. Boris Kondratieff, systematic ecologist with CSU, conducted insect identifications, and Tamla Blunt with the Identification and Diagnostic Service Clinic conducted pathogen diagnostics. Further pathogen diagnostics were carried out as needed by the USDA labs in Olney, TX (for diagnosis of Karnal bunt) and Beltsville, MD (for diagnosis of *P. ramorum* using PCR).

## 1. CAPS CORE Project

CDA - Plant Industry Division

Project Coordinator: Kara Hempy-Mayer

**Outreach.** The focus of our exotic pest outreach was on generating materials highlighting a number of exotic pests of concern to Colorado. Materials were shared with the USFS, CO State Parks, CSU, NPS, private nurseries, and farmers. Newspaper informational ads were placed in five major newspapers in Colorado.

### Booklets

- Exotic Pests of Trees and Shrubs
- Exotic Pests of Field Crops
- Beware of Plundering Pests

### Posters

- Protect Colorado's Landscape (firewood)
- Don't Destroy the Things You Love (firewood)

### Newspaper Ads

- Protect Colorado's Landscape (firewood)

**Rapid Response.** USDA APHIS PPQ carried out an



Emerald Ash Borer Full Scale Exercise in Broomfield, Colorado for training in use of the Incident Command System in response to an exotic pest introduction or outbreak. Participants included Colorado Department of Agriculture, state PPQ Officers, USFS, CSU, Master Gardeners, Broomfield City Foresters, and others. Work has also been done on a Colorado Emergency Response Plan, which will hopefully be finalized in the coming year and will set the guidelines for responding to an exotic pest introduction or outbreak.

**Priority Pest List, Pest Risk and Pathway Analysis.** The SCC put together a State Priority Pest List of exotic pests for FY2006. We will be revising the list in the spring of 2007, and hope to get input from the members of the State Pest Committee for this revision and for planning survey projects for FY2008.

### Colorado State Priority Plant Pest List

<i><b>Pest</b></i>	<i><b>Associated Pest List</b></i>
<b>Focus on Survey and Information Outreach</b>	
Apple ermine moth	Emerging Plant Pests
Asian gypsy moth	Line Item
Asian longhorned beetle	Emerging Plant Pests
Bean bacterial wilt	Western Region List
British Root-knot Nematode	National Pest List Top Twelve
Cereal cyst nematode	Western Region List
Cereal leaf beetle	State List
Cherry ermine moth	Emerging Plant Pests
Chrysanthemum white rust	Western Region List
Citrus longhorned beetle	Line Item
Daylily rust	Western Region List
Egyptian cottonworm	National Pest List Top Twelve
Emerald ash borer	Western Region List
European gypsy moth	Line Item
False codling moth	National Pest List
Fruit piercing moth	National Pest List Top Twelve
Giant woodwasp	National Pest List Top Twelve
Japanese beetle	Emerging Plant Pests
Karnal bunt	Line Item
Khapra beetle	Emerging Plant Pests
Light brown apple moth	Western Region List
Mediterranean cereal cyst nematode	National Pest List
Metallic beetle	National Pest List Top Twelve
Old world bollworm	National Pest List
Passionvine mealybug	National Pest List Top Twelve
Pear leaf blister moth	National Pest List
Phytophthora ramorum	Emerging Plant Pests
Pine-tree Lappett	National Pest List
Plum fruit moth	Western Region List
Potato cyst nematode	Line Item

Pratylenchus spp.	National Pest Universe
Ralstonia solanacearum Race 3 Biovar 2	National Pest List Top Twelve
Siberian silk moth	National Pest List Top Twelve
Silver Y moth	National Pest List Top Twelve
Sirex wood wasp	National Pest List Top Twelve
Small white marmorated longhorned beetle	National Pest List
Soybean aphid	Emerging Plant Pests
Soybean pod borer	Western Region List
Soybean rust	Select Agent List
Summer fruit tortrix moth	National Pest List Top Twelve
<b>Focus on Information Outreach Only</b>	
Apple maggot/hawthorne maggot	Western Region List
Cactus moth	Western Region List
Cherry bark tortrix	National Pest List
European grape vine moth	CO State Pest List only
horse thistle	Emerging Plant Pests
witchweed	National Pest List Top Twelve
<b>Additional Pests Of Concern</b>	
Archips xylosteanus	CO State List only
bacterial wilt of potato	National Pest List
bulb eelworm	Western Region List
Chili thrips	CO State List only
Columbia root knot nematode	Western Region List
European chaffer	Western Region List
European corn borer	Western Region List
Golden nematode	CO State List only
Iris yellow spot virus (tospovirus)	Western Region List
Japanese wax scale	National Pest List
Mediterranean pine engraver	CO State List only
onion white rot	Western Region List
Oriental beetle	CO State List only
passionvine mealybug	National Pest List
pink gypsy moth	National Pest List
Pine shoot beetle	Emerging Plant Pests
potato tuborworm	CO State List only
Red imported fire ant	Line Item
Red-haired bark beetle	CO State List only
Silverleaf whitefly	CO State List only
Soybean cyst nematode	Western Region List
Stewart's wilt	Western Region List
Swede midge	CO State List only
Sweet potato whitefly	CO State List only
Western cherry fruit fly	Western Region List
White pine blister rust	Western Region List



## 2. General Weed Survey and Biocontrol Program

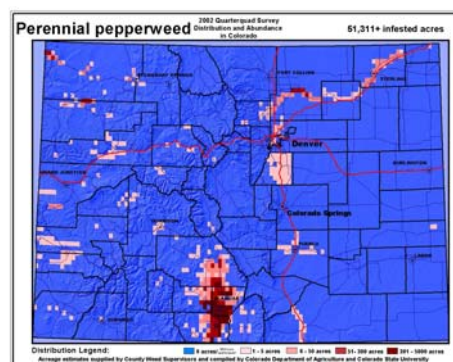
CDA - Conservation Services Division

Project Coordinators: Eric Lane and Dan Bean

The objective of this program are: to survey, identify and map infestations of exotic, invasive weeds throughout Colorado; to produce biocontrol agents at the State Insectary or to locate and collect agents from the field for the purpose of redistribution to sites in Colorado and surrounding states; to provide biological control agents to the appropriate federal, state and local agencies; to cooperate with these agencies in biocontrol implementation programs; to assess the establishment and effectiveness of biocontrol agents against exotic noxious weeds and to make these results available to the appropriate federal, state and local agencies.

**Weed Mapping.** State distribution maps are currently being developed for two list B Colorado noxious weed species, houndstongue (*Cynoglossum officinale*) and perennial pepperweed (*Lepidium latifolium*), based on survey information received by Colorado Counties in the fall of 2006. Other list B species for 2006 mapping included: black henbane, diffuse knapweed, oxeye daisy, and yellow toadflax. List A species' distribution and abundance maps are continuously updated on a year to year basis. Go to

[www.ag.state.co.us/CSD/Weeds/mapping/QuarterQuadSurvey.html](http://www.ag.state.co.us/CSD/Weeds/mapping/QuarterQuadSurvey.html) for additional maps and data.



Current quarterquad map of perennial pepperweed distribution in Colorado.



*Larinus minutus* on knapweed

**Biocontrol Release and Recovery.** Twelve biocontrol agents were released for eleven weed species during the 2006 field season. Among the highest releases were *Aceria malherbae* mites and *Tyta luctuosa* moths for field bindweed, *Aphthona* beetles for leafy spurge, and *Larinus minutus* weevils for diffuse and spotted knapweed.

### Release numbers for biocontrol agents for 2006.

Target Weed	Biocontrol Agent	Number Released
Leafy spurge	<i>Aphthona</i> spp.	293,582
Field bindweed	<i>Aceria malherbae</i>	186,000
	<i>Tyta luctuosa</i>	30,346
Saltcedar	<i>Diorhabda elongata</i>	102,000
Diffuse & spotted knapweed	<i>Larinus minutus</i>	16,800
	<i>Cyphocleonus achates</i>	848
Puncturevine	<i>Microlarinus lareynii</i>	4,350
Canada thistle	<i>Urophora cardui</i>	1,935
Yellow & Dalmation Toadflax	<i>Calophasia lunula</i>	1,833
Purple loosestrife	<i>Galerucella</i> spp	315
	<i>Hylobius transversovittus</i>	100
Musk thistle	<i>Trichosiocalus horridus</i>	100

Most species were recovered from well-established field insectories for redistribution. Sweep net surveys were made in Rio Blanco, Boulder, Adams, Larimer and Jefferson Counties in search of collectable populations of *Oberea erythrocephala*, a long horned beetle used for leafy spurge biocontrol. One site was located in Jefferson County that had collectable populations of the beetle. Beetles had been released at the site 12 years ago and the site had been periodically monitored by Debra Eberts, U S Bureau of Reclamation. It is anticipated that the site will be used in 2007 for a limited collection and redistribution program.

**Emerging Biocontrol Programs.** The Insectary collaborated with USDA APHIS in the collection and redistribution of *Diorhabda elongata* in the western US. *D. elongata* were collected from field sites in Mineral and Pershing Counties in western Nevada by USDA APHIS and the CDA (Palisade Insectary). Beetles were held at the Insectary and shipped to sites in 8 states, at the request of USDA collaborators in those states (Table 3).



*Diorhabda elongata* on saltcedar.

**Totals of *D. elongata* shipments, by state, for 2006 (APHIS site releases only)**

<u>State</u>	<u># <i>D. elongata</i> shipped from Colorado</u>
South Dakota	22,000
Wyoming	20,000
Colorado	14,000
Oregon	14,000*
Washington	9,000
Montana	8,000
Nebraska	7,000
Kansas	6,000
Totals	100,000

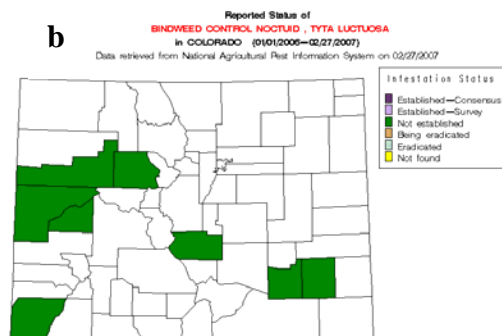
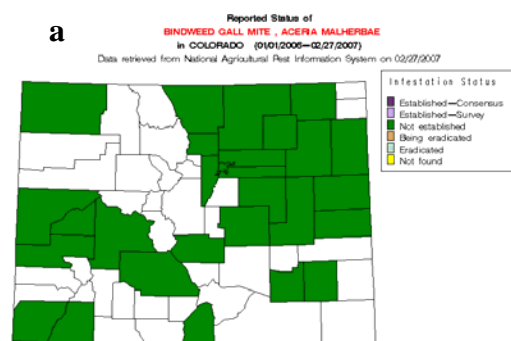
\*9,000 of these were taken to Oregon directly by Gary Brown, USDA APHIS

Beetles were also collected from a Bureau of Reclamation field site below Lake Pueblo (Pueblo County) Colorado to start a colony at the Insectary and establish a field population in Mesa County on the Dolores River.

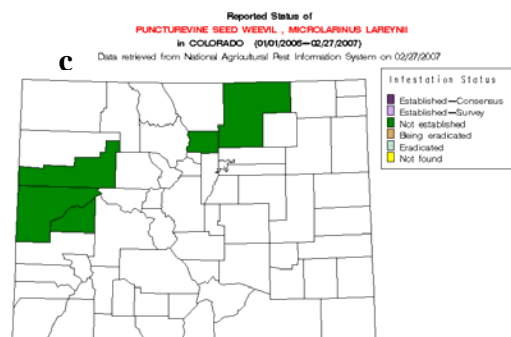
**Monitoring Programs.** In 2006, the Insectary established a more intensive monitoring program in order to document establishment and success of biocontrol agents. Following APHIS protocols, four and three monitoring sites were established in Mesa and Montezuma Counties, respectively, for *D. elongata*. A monitoring protocol developed in collaboration with Sound Science LLC was also implemented for leafy spurge biocontrol monitoring and is being tested for Dalmatian toadflax and Russian knapweed monitoring. To date, 19 and 3 leafy spurge monitoring sites have been established in Rio Blanco and Boulder Counties, respectively. One Russian knapweed monitoring site has been established in Montezuma County, and two dalmation toadflax sites in Mesa County.



*Apthona flava* on  
leafy spurge

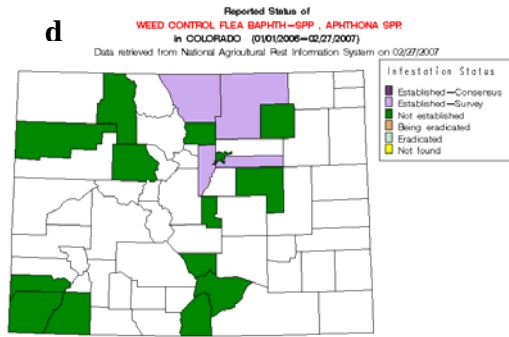


The Center for Environmental and Regulatory Information Systems does not certify the accuracy or completeness of the map.

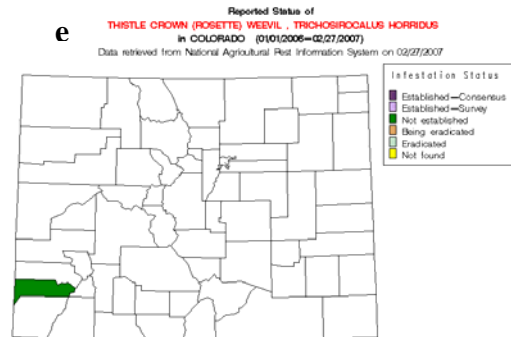


The Center for Environmental and Regulatory Information Systems does not certify the accuracy or completeness of the map.

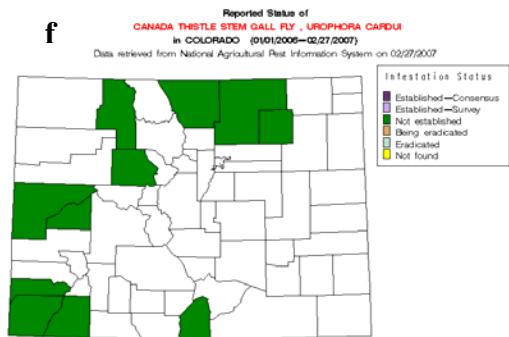
Green and purple counties indicate those counties in which a) *Aceria malherbae* and b) *Tyta luctuosa*, c) *Microlarinus lareynii*, were released and recovered, respectively, in Colorado in 2006. (NAPIS 2006)



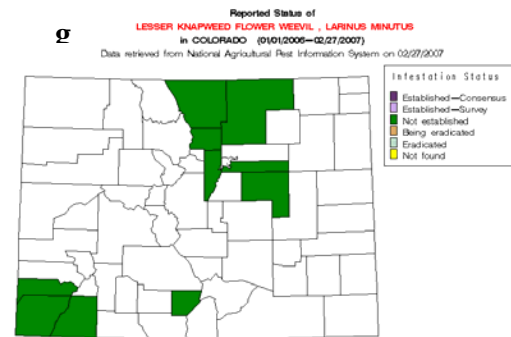
The Center for Environmental and Regulatory Information Systems does not certify the accuracy or completeness of the map.  
Negative data spans over last 5 years only.



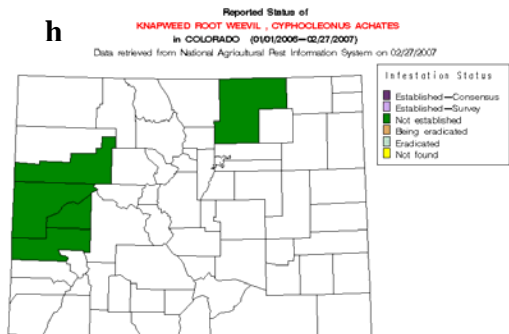
The Center for Environmental and Regulatory Information Systems does not certify the accuracy or completeness of the map.



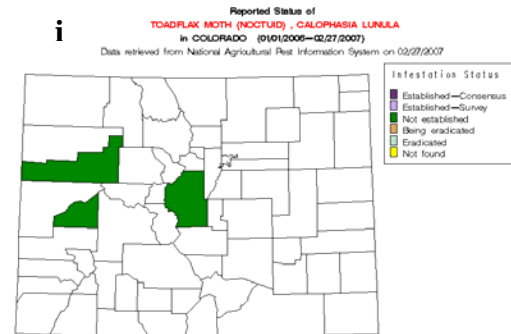
The Center for Environmental and Regulatory Information Systems does not certify the accuracy or completeness of the map.



The Center for Environmental and Regulatory Information Systems does not certify the accuracy or completeness of the map.



The Center for Environmental and Regulatory Information Systems does not certify the accuracy or completeness of the map.



The Center for Environmental and Regulatory Information Systems does not certify the accuracy or completeness of the map.

Green and purple counties indicate those counties in which d) *Aphthona* spp., e) *Trichosirocalus horridus*, f) *Urophora cardui*, g) *Larinus minutus*, h) *Cyphocleonus achates*, and i) *Calophasia lunula* were released and recovered, respectively, in Colorado in 2006 (NAPIS 2006).

### 3. Cereal Leaf Beetle Biocontrol Program

Colorado Department of Agriculture - Plant Industry Division

Project Coordinators: Eric Lane and Dan Bean

---

The purpose of this project was to continue the production, processing and shipment of approximately 25,000 *Anaphes*-parasitized CLB eggs for use by collaborators in establishing *Anaphes flavipes* in the western US, to supply CLB eggs to the Pullman, WA quarantine facility for rearing new egg parasitoids better suited to the western US, and to develop more efficient methods for mass rearing CLB egg parasitoids.



Cereal leaf beetle

Over the season we received a total of 28,261 adult CLB from our cooperators in North Carolina, Oregon, Washington, and Utah. From these we eventually produced and shipped 21,096 parasitized eggs to cooperators in Oregon and Washington. Idaho did not receive parasitized eggs this year. In June, toward the end of the season, we received about 250 field collected and parasitized eggs from our cooperators in Wyoming. These were incorporated into our culture. We also received 1,660 adult CLB in July, 2006. These will be used for ongoing experiments in which we subject them to cold temperatures and break diapause.

### 4. Cereal Leaf Beetle Survey

Colorado State University - Dept. of BioAgricultural Sciences & Pest Management

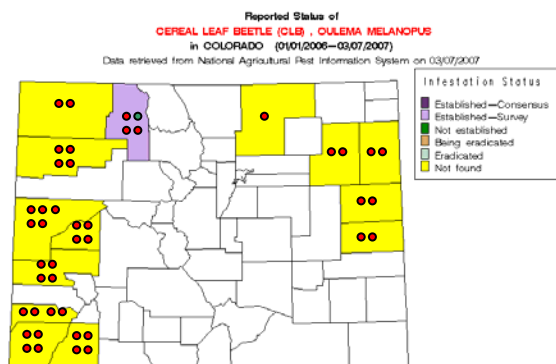
Project Coordinators: Lou Bjostad and David James

---

Cereal leaf beetle found: Yes, low levels

Cereal leaf beetle is a threat to Colorado cereal commodities, chiefly wheat. It was first detected by Bob Hammon in Colorado in 2001 in Routt County, and detection surveys have been carried out every year since, with more beetles found in Larimer, Boulder, and Weld counties in 2002. No beetles were found from 2003-2005. The 2006 survey was conducted by David James, Ron

Meyer of Golden Plains Extension, and Bob Hammon of Mesa County Extension. Visual and sweep surveys were conducted in 15 counties. All surveys were done in late May to early June when CLB is most likely to be present.



The Center for Environmental and Regulatory Information Systems does not certify the accuracy or completeness of the map. Negative data spans over last 5 years only.

CLB larvae were found at low levels at one site in Routt County. This is the first season since 2002 that CLB was found in Colorado. With the finding this year, it has been designated as established By Dr. Lou Bjostad and David James in Routt County.

NAPIS map of counties surveyed in 2006 for CLB. Red circles indicate the number of sites surveyed per county, and green circles indicate the number of sites positive for CLB per county. Purple indicates establishment, yellow = surveyed and not found.

## 5. Emerald Ash Borer Trap Tree Detection Survey

Colorado State University - Dept. of BioAgricultural Sciences & Pest Management  
Project Coordinators: Dr. William Jacobi and Dave Leatherman

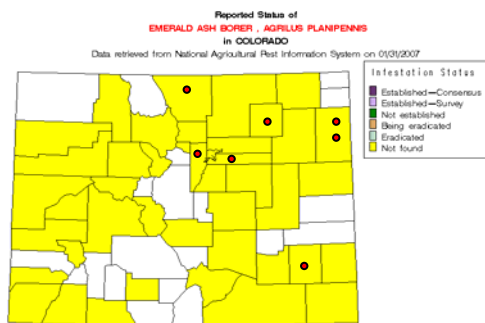
---

***Emerald ash borer found: 0***

Emerald ash borer (*Agrilus planipennis*) is currently causing severe mortality among all species of ash trees in the Midwest. If introduced to Colorado, it could cause the death of over 25% of landscape, windbreak trees. Green ash and white ash account for up to 70% of the trees in some communities. The value of these trees as wind breaks, natural areas along the Platte and Republican Rivers, and landscape trees in urban communities throughout Colorado would be over \$10 million.



*emerald ash borer*



NAPIS map of Colorado counties surveyed for emerald ash borer in 2006. The red circle represents the number of sites per county. Surveys in remaining counties are described in the Exotic Wood Associated Insect Survey.

A stressed ash trap tree detection survey was conducted in Colorado at seven high risk sites. Three donated 1.5-in. caliper green ash trees in pots were placed from June 12-19, 2006 at a large distribution center and six state park campgrounds. Trees were not serviced but were visited and checked for borers on August 19 and 28, 2006. All trees were negative for emerald ash borer. Firewood posters and EAB information was distributed at all survey locations and six additional locations, including other campgrounds, CO Forest Service Offices, and State Division of Wildlife Offices.

## 6. Exotic Fruit Pest Survey

CDA - Plant Industry Division

Project Coordinators:

Kara Hempy-Mayer

In cooperation with:

CSU - Dept. of BioAgricultural Sciences & Pest Management

Project Coordinators: Lou Bjostad and

David James

---

***Target exotic fruit pests found: 0***

The CDA and CSU personnel conducted an early detection trap survey for the following exotic fruit pests:

- pear leaf blister moth - *Leucoptera malifoliella*

(photo by Agriculture and Agri-Food Canada Archives, [www.forestryimages.org](http://www.forestryimages.org))



- apple ermine moth - *Herpestomus brunnicornis*

(photo by Eric LaGasa, WA State Dept. of Ag. [www.forestryimages.org](http://www.forestryimages.org))

- summer fruit tortrix moth - *Adoxophyes orana*

(photo by Hania Arentsen, Garden Safari [www.forestryimages.org](http://www.forestryimages.org))

- false codling moth - *Cryptophlebia leucotreta*

(photo by J.H. Hofmeyr, Citrus Research International, [www.forestryimages.org](http://www.forestryimages.org))

- European grape vine moth - *Lobesia botrana*

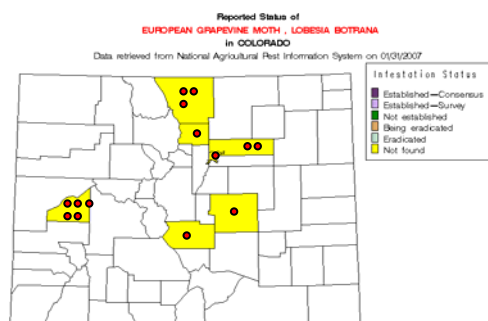
(photo by Entopix Vol. 1)

- cherry bark tortrix – *Enarmonia formosana*.

(photo by Eric LaGasa, WA State Dept. of Ag. [www.forestryimages.org](http://www.forestryimages.org))



Summer fruit tortrix, false codling moth, and pear leaf blister moth were ranked #11, 28, and 31, respectively, on the 2006 National Pest List. Apple ermine moth and cherry bark tortrix were 2006 Emerging Plant Pests, and the rest pose specific restrictions to the export of Colorado products.



**Figure 4.** NAPIS maps of Colorado counties surveyed in 2006 for exotic fruit pests. Red circles represent the number of trap tree sites per county. Circles do not indicate actual site locations.

Surveys were performed with pheromone baited Pherocon 1C wing-style traps at 14 sites in Colorado. Sites included a botanical garden, five orchards around the Denver-metro area, Longmont, Colorado Springs, and Pueblo, a vineyard, and orchards and nurseries in high fruit production areas on the western slope in Delta County and on the eastern slope in Larimer County. Trapping began in May or June and was performed until October. Traps were checked bimonthly. No targeted pests were found.

## 7. Gypsy Moth Detection Survey

Colorado State Forest Service

Project Coordinator: Ingrid Aguayo, CSFS Forest Entomologist

**Gypsy moths found = 0**

This project was a continuation of a long-term European and Asian gypsy moth detection survey in Colorado. Gypsy moth has not yet become established in Colorado. Its introduction could significantly damage the forests of Colorado, affecting the natural environment, the forest product industry, and tourism.

Traps were deployed from June 5 through July 25, 2006. A total of



female and male gypsy moths

1,598 traps were deployed throughout all counties of Colorado, except in San Juan County. Traps were collected from September 9 through December 14, 2006. The slow collection of traps was due to the limited time hourly students had because of school commitments. From the total traps deployed, 235 traps were missing, and therefore we entered data for 1,363 of the traps into NAPIS.

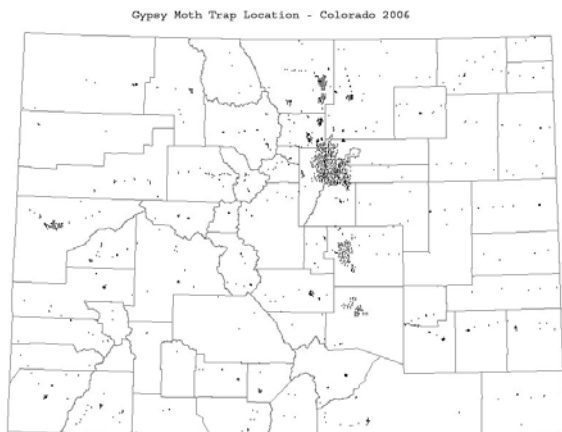


Figure 5. Map of trap locations in Colorado – Gypsy moth FY06.

From the total traps checked, no gypsy moths were found. A few Lepidoptera were found in some traps; these were confirmed by Ingrid Aguayo to be native species of the genus *Malacosoma* and *Autographa*. One suspicious Lepidoptera was found, this was confirmed by Dr. Kondratieff to be from the genus *Dasichyra*. Some *Diptera*, *Coleoptera*, and *Hymenoptera* were also found in the traps but were not further identified.

## 8. *Kaphra* Beetle

Colorado State University - Dept. of BioAgricultural Sciences & Pest Management  
Project Coordinators: Lou Bjostad and David James

### *Khaphra* beetle found: 0

The purpose of this project was to conduct early detection surveys for *Trogoderma granarium* (Khaphra beetle) in Colorado. This pest has been identified as a high priority pest on the 2006 National Emerging Plant Pest List and Homeland Security Priority Pest List. Additionally, *T. granarium* is listed as a restriction to exports of seeds and cereal grains to Mexico, Australia, and Columbia from Colorado. Surveys conducted during the 2006 growing season can be used to identify pest-free zones.



Khaphra beetle larvae and adult

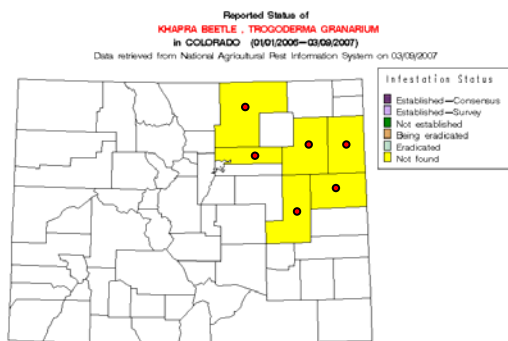


Figure 6. NAPIS map of counties surveyed for Khaphra Beetle in Colorado in 2006. Red circles indicate the number of sites surveyed per county.

Surveys were performed by Elisa Bernklau of Colorado State University, Department of Bioagricultural Sciences and Pest Management. Grain elevators, grain storage facilities, and small businesses selling grain were surveyed in eight counties by Colorado State University personnel. Trapping was conducted using wall-mounted vertical traps and pitfall traps and baited with *Trogoderma* pheromone. No positive catches were reported.

## 9. Karnal Bunt

Colorado State University - Dept. of BioAgricultural Sciences & Pest Management  
Project Coordinators: Lou Bjostad and David James

**Karnal bunt found: 0**

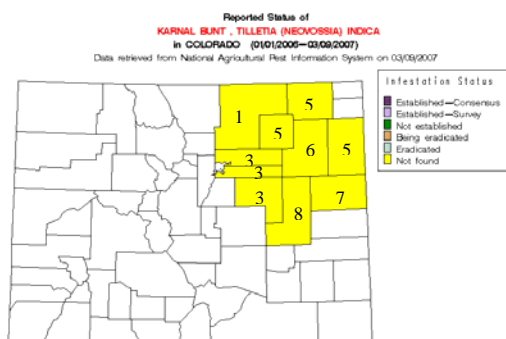
The purpose of this project was to continue the Karnal Bunt National Surveys in Colorado to help monitor the distribution and spread of Karnal Bunt in the United States and facilitate wheat exports by identifying areas free of disease.



Karnal bunt symptoms on wheat

Surveys were performed by Elisa Bernklau of Colorado State

University, Department of Bioagricultural Sciences and Pest Management. Due to previous year's lackluster response from cooperators, we decided to collect samples directly on site. This year 57 samples were collected from 11 counties. Counties targeted for this survey were those that had not been sampled in the last few years. All samples tested negative for Karnal Bunt.



**Figure 7.** NAPIS map of counties surveyed in 2006 for Karnal Bunt in Colorado. Numbers indicate the number of samples collected per county.

## 10. Old World Bollworm

Colorado State University - Dept. of BioAgricultural Sciences & Pest Management  
Project Coordinators: Lou Bjostad and David James

**Old World bollworm found: 0**

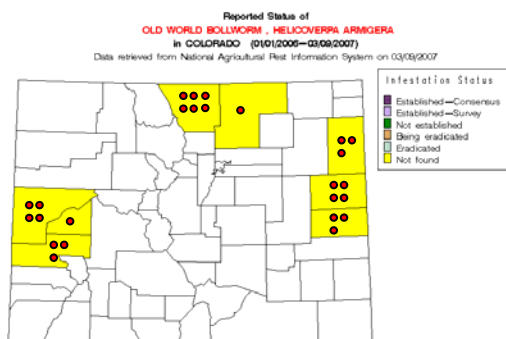
The purpose of this project was to conduct early detection surveys for *Helicoverpa armigera* (Old World bollworm) in Colorado, and to help establish state or county level exemptions for Colorado in the export of

agricultural commodities if negative data is found.

This pest is ranked 6<sup>th</sup> on the CAPS FY06 National Pest Detection List, and is a pest of wheat, cotton, and tomato, all of which are products grown in Colorado. This survey for Old World bollworm was conducted in several counties for the first time in Colorado.



Old World bollworm larvae on corn



**Figure 8.** NAPIS map of counties surveyed in 2006 for Old World bollworm in Colorado.

Surveys were performed by Bob Hammon of Mesa County Extension, David James, and Ron Meyer of Golden Plains Extension. Surveys were performed with pheromone baited pherocon 1C wing traps. Approximately 50 traps at 25 sites were placed in or near corn fields and in nurseries. Traps were installed by mid-May and serviced bimonthly or monthly depending on location through mid-September. Servicing of traps included collection of all contents and replacement of traps and attractants as directed. All trap contents were initially screened by David James and Bob Hammon. All trap catches were negative.

## ***11. Survey of Colorado Production areas for Exotic/Emerging Plant Pests***

*Colorado State University - Dept. of BioAgricultural Sciences & Pest Management*

*Project Coordinators: Ned Tisserat*

### ***Target pests found: 0***

The purpose of this project was to conduct a state-wide survey of ornamental and tomato production areas for the presence of various plant pathogens and arthropods on the National Select Agent list, the CAPS pest detection list, and the western region pest

list. The primary focus of the survey was to ascertain the presence/absence of the following pathogens and insects:

- *Ralstonia solanacearum* Race 3 Biovar 2 – National Select Agent list;

(photo by Plant Protection Service Archives [www.forestryimages.org](http://www.forestryimages.org))

•

- Sudden oak death – *Phytophthora ramorum* – Emerging Plant Pest List;

(photo by Joseph O'Brien, USDA Forest Service, [www.insectimages.org](http://www.insectimages.org))

- Chrysanthemum white rust – *Puccinia horiana* – Emerging Plant Pest List;

(photo by Central Science Laboratory, Harpenden Archives, British Crown, [www.forestryimages.org](http://www.forestryimages.org))

- Passionvine mealybug (*Planococcus minor*) – CAPS Pest Detection List;

(United States National Collection of Scale Insects Photographs Archive, USDA ARS, [www.forestryimages.org](http://www.forestryimages.org))

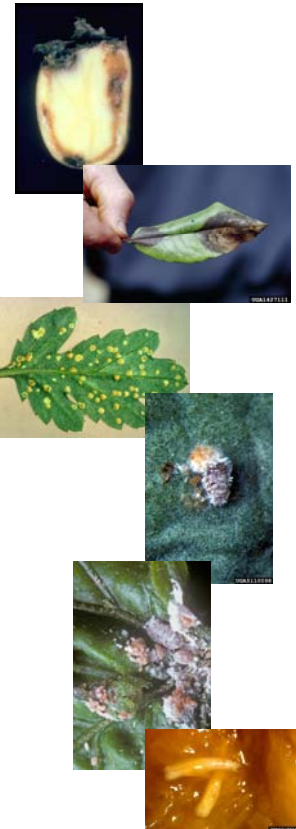
- Pink hibiscus mealybug (*Maconellicoccus hirsutus*) – Emerging Plant Pest List;

(Dale E. Meyerdirk, USDA APHIS PPQ, [www.forestryimages.org](http://www.forestryimages.org))

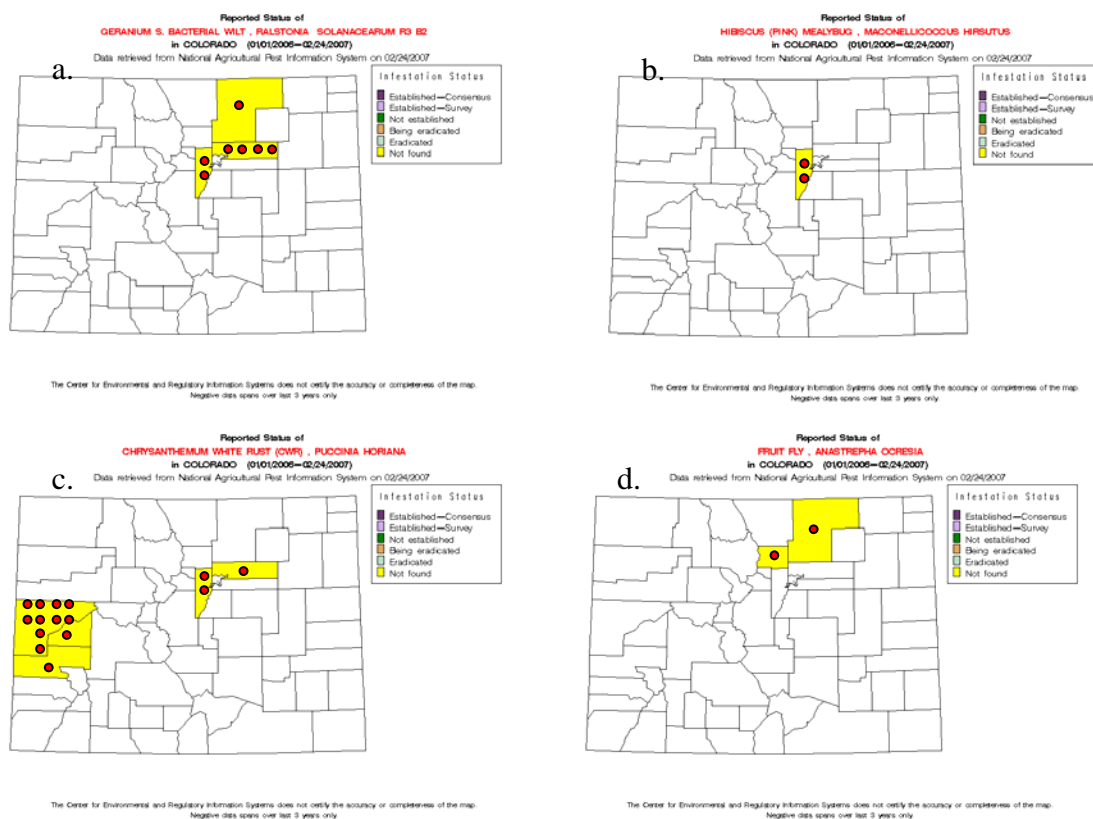
- Exotic fruit flies - *Anastrepha* sp. in tomato production – CO pest list.

(John W. Dooley, USDA APHIS PPQ, [www.forestryimages.org](http://www.forestryimages.org))

Host plants in Colorado include potatoes, tomatoes, chrysanthemums, and various other foliage and ornamental plants. Information on all insects and diseases was recorded during the survey.



A total of 27 production facilities throughout Colorado were surveyed for the various hosts listed above. Plants were visually surveyed. Suspicious plants were returned to the diagnostic lab and either viewed microscopically (chrysanthemum rust), cultured, had PCR tests run (geraniums), or forwarded for insect identification. All samples were negative for the pests listed above.



NAPIS map of Colorado counties surveyed in 2006 for: a. *Ralstonia solanacearum* Race 3 Biovar 2; b. hibiscus pink and passionvine mealybugs; c. chrysanthemum white rust; and d. *Anastrepha* spp. Red circles indicate the number of sites surveyed per county.

## 12. *Spodoptera littoralis*

Colorado State University - Dept. of BioAgricultural Sciences & Pest Management  
Project Coordinators: Lou Bjostad and David James

*Spodoptera littoralis* found: 0

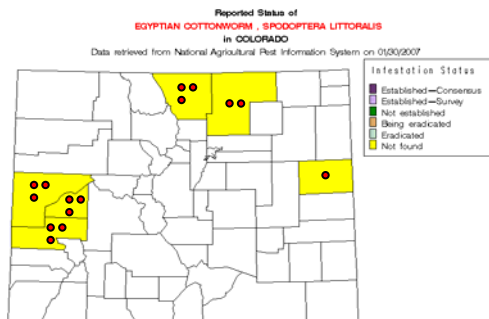
The purpose of this project was to conduct early detection surveys for *Spodoptera littoralis* in Colorado and to help establish state or county level exemptions for Colorado in the export of agricultural commodities if negative data is found. *S. littoralis* is ranked ninth on the 2006 National Plant Pest List. Major agricultural crops that are hosts for *S. littoralis* in Colorado include corn, alfalfa, dry beans, apples, and grapes.



*Spodoptera littoralis* larvae

This survey was conducted in several counties in Colorado for the first time in 2006.

Surveys were performed by Bob Hammon of Mesa County Extension, David James, and Ron Meyer of Golden Plains Extension with pheromone baited pherocon 1C wing traps. Twenty traps at 15 sites were placed in or near corn fields, and nurseries. Traps were installed by mid-



NAPIS map of counties surveyed in 2006 for *Spodoptera littoralis* in Colorado. Red circles indicate the number of sites surveyed per county

May and serviced bimonthly or monthly depending on location through mid-September. Servicing of traps included collection of all contents and replacement of traps and attractants as directed. All trap catches were negative, and all 2006 survey data are available.

### 13a. *Phytophthora ramorum* – National Trace Forward Survey

USDA-APHIS-PPQ Colorado

Project Coordinators: Lisa Peraino and Michael Winks

***Phytophthora ramorum* found: 0**

A National Trace Forward Survey for *P. ramorum* (sudden oak death) was carried out by the CDA and PPQ in response to the occurrence of *P. ramorum* in a *Syringa vulgaris* plant sample from a nursery in McMinnville, Oregon in June of 2004, as diagnosed by the USDA in Beltsville, MD in November of 2004. *P. ramorum* is listed on the 2006 National Emerging Plant Pest List.



Viburnum (left) and Rhododendron with symptoms of *P. ramorum*

Surveys were carried out by CDA State Inspectors and PPQ Plant Health Safeguarding Specialists following USDA APHIS PPQ National Trace Forward Survey protocols (2006). Thirteen nurseries were surveyed (three of which were also National Nursery Survey sites this year), with PPQ surveying 5 and CDA surveying 8 nurseries in the Denver-metro area. Approximately 63 samples were taken from host plants in nurseries receiving stock from an infected nursery in Oregon. One hundred ninety-nine total plants were sampled, and of these, most of them were from *Viburnum*, *Syringa*, and *Taxus* species, with a few each from *Abies*, *Rhododendron*, *Magnolia*, *Fagus*, *Salix*, and *Arctostaphylos* (21 species total). All samples tested negative for *P. ramorum*.

### 13b. *Phytophthora ramorum* National Nursery Survey

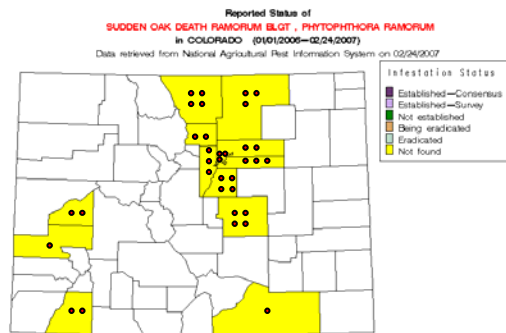
Colorado Department of Agriculture - Plant Industry Division

*Project Coordinators: Kara Hempy-Mayer*

***Phytophthora ramorum* found: 0**

---

The purpose of this project was to conduct the 2006 National Nursery Survey for *Phytophthora ramorum* in Colorado as part of a larger effort by USDA APHIS PPQ to determine the distribution of *P. ramorum* in the nursery system of the United States by surveying nurseries at risk of harboring or distributing *P. ramorum* infected plants. This is the third year of survey work begun after finding *P. ramorum* in a Colorado nursery as part of a Trace-Forward Survey in 2003. The National survey will not be completed next year, as this satisfies the required follow-up survey, and as no *P. ramorum* has been found since. However, *P. ramorum* will be included in a production area survey in 2007.



NAPIS map of Colorado counties surveyed for *P. ramorum* in both National Nursery and Trace Forward Surveys. The red circle represents the number of survey sites per county.

Site selection and surveys were conducted according to the *P. ramorum* 2006 National Nursery Survey Manual. Twenty-four nurseries were selected based on their presence on the trace-forward list from 2005, any positive findings in previous years, and abundance of host material. Coincidentally, three of these nurseries also went through a trace-forward survey this year. Approximately an even number of nursery dealers and growers were surveyed, with 13 dealers and 11 growers. In all, 756

plants were surveyed, and 590 plants were sampled, with 132 total samples taken and submitted to the Plant Diagnostic Clinic at CSU for diagnosis. The most commonly sampled plants in Colorado were *Viburnum* and *Syringa* species. Approximately 30 plants each were sampled of *Taxus*, *Rosa*, and *Rhododendron* species, while less than 10 plants were sampled from each of another 13 species (38 species total). All samples tested negative for *P. ramorum*.

#### ***14. Exotic Wood Boring Insect Survey***

*Colorado Department of Agriculture - Plant Industry Division*

*Project Coordinators: Kara Hempy-Mayer*

*In cooperation with:*

*Colorado State University - Dept. of BioAgricultural Sciences & Pest Management*

*Project Coordinators: Lou Bjostad and David James*

---

***Target exotic pests found: 0***

The purpose of this project was to conduct an early detection visual survey along with non-specific trapping for the following exotic wood pests:

## **Deciduous Trees:**

- Asian longhorned beetle (*Anoplophora glabripennis*)

(photo by Kenneth R. Law, USDA APHIS PPQ, [www.forestryimages.org](http://www.forestryimages.org))

- citrus longhorned beetle (*A. chinensis*)

(photo by Washington State Department of Agriculture Archives, [www.forestryimages.org](http://www.forestryimages.org))

- emerald ash borer (*Agrilus planipennis*)

(photo by Edward Czerwinski, Ontario Ministry of Natural Resources, [www.forestryimages.org](http://www.forestryimages.org))

- metallic beetle (*Agrilus biguttatus*)

(photo by Andrea Battisti, Università di Padova, [www.forestryimages.org](http://www.forestryimages.org))

- small white-marmorated longhorned beetle (*Monochamus sutor*)

(photo by Luis-Michel Nageleisen, Département de la Santé des Forêts, [www.forestryimages.org](http://www.forestryimages.org))

## **Coniferous Trees:**

- Sirex woodwasp (*Sirex noctilio*)

(photo by David R. Lance, USDA APHIS PPQ, [www.forestryimages.org](http://www.forestryimages.org))

- Siberian silk moth (*Dendrolimus superans sibiricus*)

(photo by David R. Lance, USDA APHIS PPQ, [www.forestryimages.org](http://www.forestryimages.org))

- pine-tree lappet (*Dendrolimus pini*).

(photo by Hannes Lemme [www.forestryimages.org](http://www.forestryimages.org))



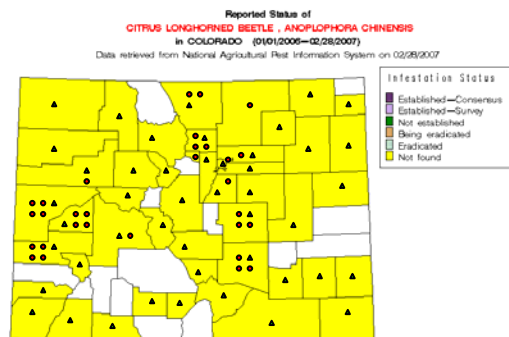
Exotic wood associated insects have emerged as significant pests to established landscape plantings as well as wood commodities. Valuable wood resources in the state of Colorado are at risk to these types of exotics. Siberian silk moth, metallic beetle, pine-tree lappet, and small white-marmorated longhorned beetle are listed as #3, 6, 30, and 34, respectively, on the CAPS 2006 National Pest List; Asian longhorned beetle is listed on the National Emerging Plant Pest (EPP) List, and emerald ash borer and citrus longhorned beetle are listed on the Supplemental National EPP List with their own line item funding.

Surveys were done according to the Exotic Wood Borer Bark Beetle National Survey protocol. Twenty-eight high-risk sites were trapped this season. Traps were baited with ethanol, alpha-pinene, and 3-part IPS lures. Survey sites included lumber and pallet suppliers, a firewood supplier, a state park campground, wood disposal sites a wood pallet site at a community college, nurseries, and sawmills. Traps were deployed by mid-May and were removed by mid-October. Traps were checked bimonthly to monthly depending on location.

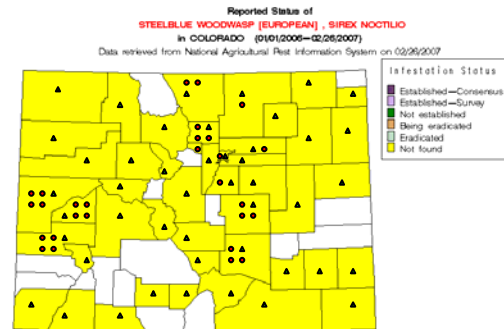
During the growing season, 500, 286, and 557 nursery dealers or growers in about 39 counties that had host material for citrus longhorned beetle, the remaining deciduous tree pests, and the coniferous tree pests, respectively, were surveyed during annual state nursery inspections. Records from these inspections were used to provide evidence of the absence of these pests, as inspectors were directed to look for them, and none for found. Visual surveys were also completed at the trap survey sites, and visual surveys were conducted at 6 other sites in Adams

and Larimer County including locations near a major distribution center, a major airport (DIA), a site that offered free mulched wood to the community, and a site that offered free wooden pallets to the community. Visual inspections were performed at these sites monthly from mid-May to mid-October.

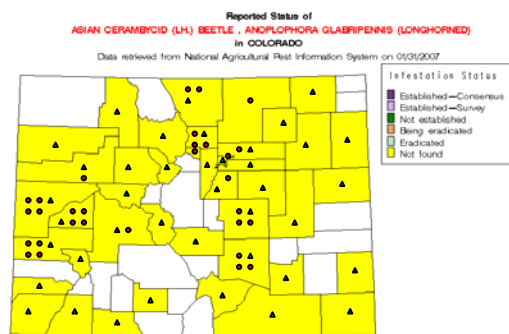
In February of 2007, PPQ officers visually surveyed 80 ash trees for emerald ash borer in the town of Thornton in Adams County. Forty of these trees were further stripped (along the trunk). No signs of emerald ash borer were found. No harmful exotic wood associated pests were found in any of these surveys



The Center for Environmental and Regulatory Information Systems does not certify the accuracy or completeness of the map.



The Center for Environmental and Regulatory Information Systems does not certify the accuracy or completeness of the map.  
Negative data spans over last 3 years only.



The Center for Environmental and Regulatory Information Systems does not certify the accuracy or completeness of the map.  
Negative data spans over last 3 years only.

NAPIS map of Colorado counties surveyed for a. Citrus longhorned beetle, (deciduous and fruit tree pests), b. Asian longhorned beetle, citrus longhorned beetle, emerald ash borer, and metallic beetle (deciduous tree pests), and c. Sirex wood wasp, Siberian silk moth, and pine-tree lappett (coniferous tree pests). The red circles represent the number of trap (with visual) survey sites per county, and the green triangles represent counties in which visual survey only surveys were conducted (number of visual sites ranges from 1-28 sites/county).

## Related Projects

### 15. Japanese Beetle

Colorado Department of Agriculture  
Project Coordinators: Jerry Cochran

**Japanese beetle found: 17,426 beetles**

The purpose of this project was to conduct a delimiting trapping survey for Japanese beetle. Japanese beetle is listed on the 2006 National Emerging Plant Pest List, and has been recovered in Colorado in surveys dating back to 1995. No infestations, however, were identified until 2002 when an established population was discovered in Palisade. That infestation has been under a cooperative eradication effort since 2004. The Palisade Japanese beetle infestation is especially worrisome with the presence of substantial peach orchards and vineyards surrounding Palisade. Peaches and grapes are both highly favored hosts. It has been determined that the population is confined to the town limits of Palisade. Another established population was identified in 2005 in the greater Denver-metro area. It was found on a golf course late in the trapping season of 2005.



Japanese beetle adult

**Overview.** Trapping surveys were conducted in El Paso, Denver, Boulder, Arapahoe, and Mesa Counties. All five of the El Paso County traps were negative and all were placed on one golf course. Thirty-seven of 79 traps were positive in the Denver area and 32 of 248 were positive in the town of Palisade (Mesa County). The traps were funnel traps from Trece Inc. and were baited with a floral lure and a sex lure attractive to males only. The floral lure is attractive to males and females and is considered to be attractive out to a shorter distance than the sex lure. All of the 18 traps in the Boulder area were negative.

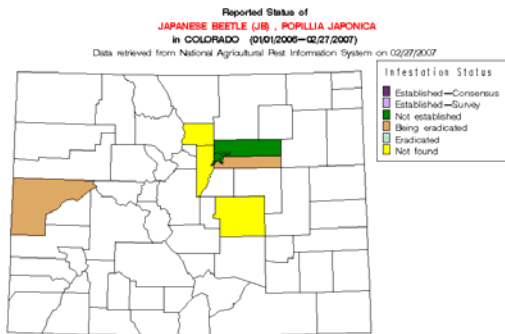
**Golf Courses.** Six golf courses were surveyed with a total of 30 traps. One golf course was in Colorado Springs, one was in Boulder and four were in the Denver area. The Boulder and Colorado Springs golf courses were both negative as was one golf course in the Denver area. One golf course caught one beetle out of a total of three traps at that course (Thornton area). One golf course in Denver City and County caught 24 beetles in five traps and one course in SE Suburban Denver (Arapahoe County) captured 17,142 beetles in 10 traps.

**Residential Areas.** Two traps were placed in residential areas of Jefferson County and were both negative. Ten traps in residential Adams County resulted in three of them being positive capturing four adults. Twenty-seven traps in residential Denver City and County resulted in three traps capturing five adults. All three of these traps were within one-mile buffer of the Denver City and County country club that was positive for JB adults (see above). The 17 traps in the one-mile buffer area around the Arapahoe County golf course captured 194 more beetles (predominately males).

**Treatments.** Two pesticides were used on the infestation in the town of Palisade. The core area and two surrounding areas near the core area were treated with a soil treatment in the grassy areas in early July with Merit 0.5 G at 1.4 ounces per 1000 square feet. The city park area was treated with Merit 0.5 G also in early July by city officials. Three properties were considered the primary source of the infestation and feeding damage was noted on Virginia creeper and were treated with Tempo as a foliar treatment on July 24<sup>th</sup>. The Virginia creeper at the city park were also treated with Tempo as a foliar treatment and Merit as soil treatment on July 26<sup>th</sup>.

In Palisade, the 2006 trapping program caught 66 adults, which represents a 95% reduction from the high point in the population found during previous surveys. These results indicate that the

eradication program is having a strong effect. Another cooperative eradication program is planned for 2007.



NAPIS map of Colorado counties surveyed Japanese beetle in 2006.

At the Denver-metro golf course, the survey program for 2006 resulted in the capture of 17,336 adults. Ninety-nine percent of the adults were captured on the golf course itself. The other one-percent of adults (187) consisted predominately of males apparently being lured off the golf course due to the sex-lure component of the traps. It is believed that the infestation is limited to the golf course proper due to winter-time irrigation practices at this high-end course. The surrounding areas are generally residential properties and do not receive much wintertime irrigation. An eradication effort (Marathon application in the summer of 2007

to the entire golf course) is planned for 2007, to be conducted by golf course personnel with assistance from the Colorado Department of Agriculture.